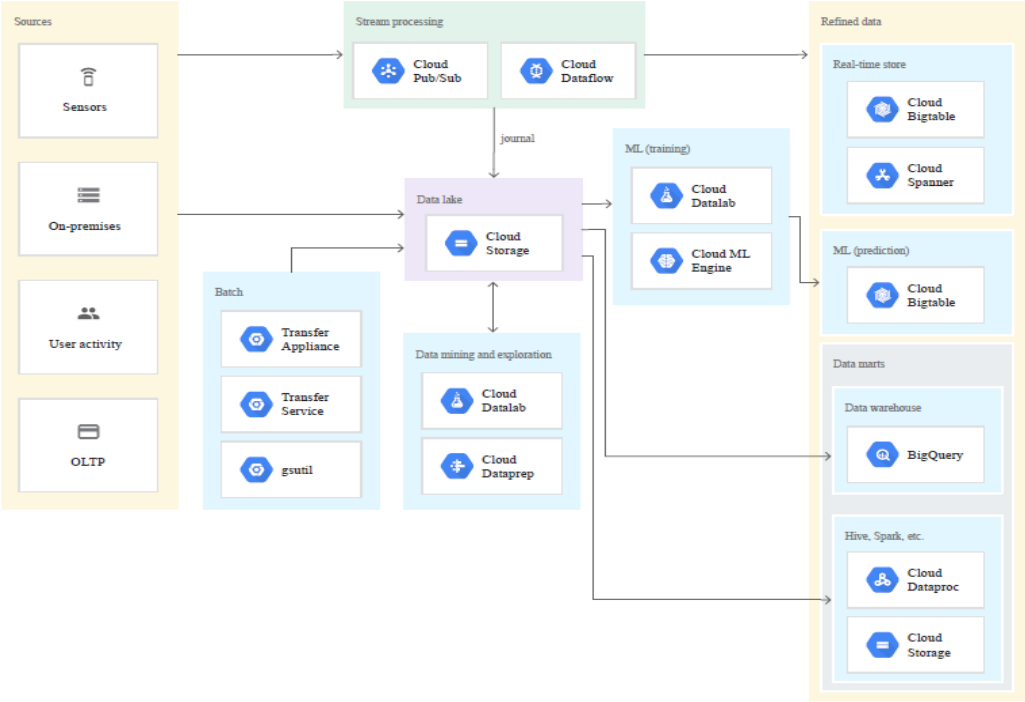


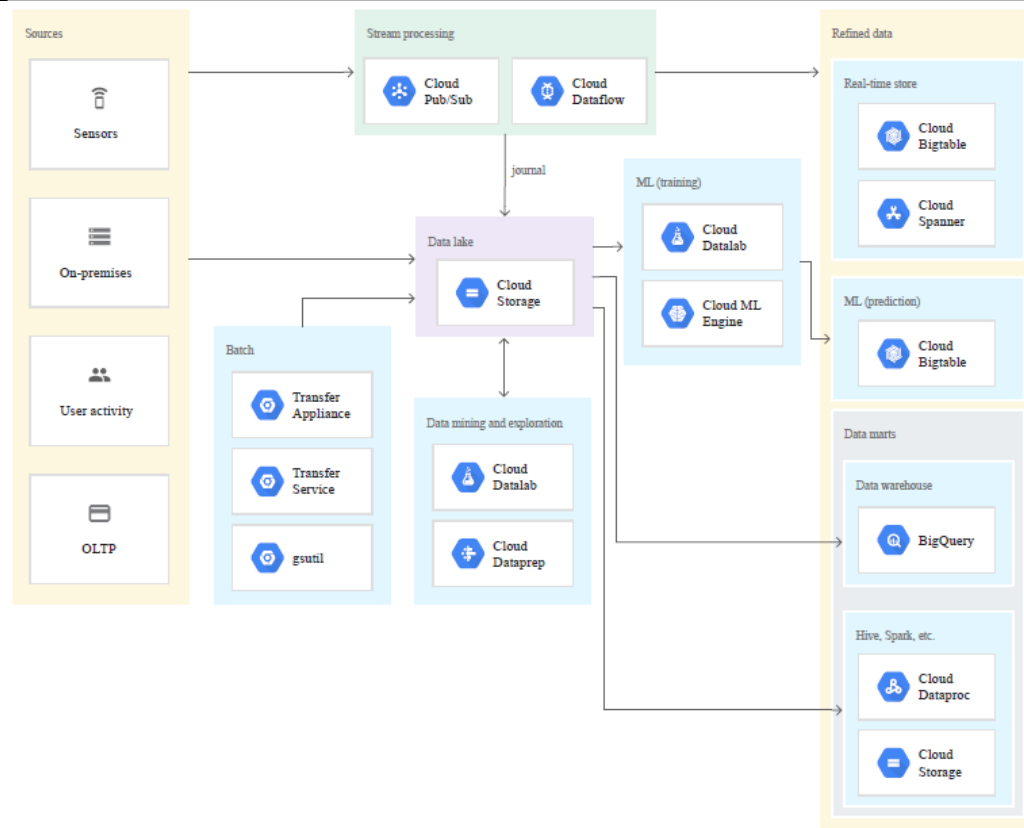
EXHIBIT B

Infringement Chart for US 6,549,988 vs. Google


Claim 1







Claim Language	Google Evidence
<p>1. A computer suitable for use in a data storage system comprising a network interconnecting a plurality of such computers, the computer comprising</p>	<p>The Cloud Storage include is a computer(On-premises) that suitable for use in a data storage system (cloud storage), the data storage system comprising a network interconnecting a plurality of such computers</p>  <p>The diagram illustrates Google's Cloud architecture, showing the flow of data from various sources through processing and storage layers to refined data outputs. The architecture is organized into several main sections:</p> <ul style="list-style-type: none"> Sources: This section on the left lists the origins of data: Sensors, On-premises, User activity, and OLTP. Stream processing: Data from sensors and on-premises sources flows into this section, which includes Cloud Pub/Sub and Cloud Dataflow. Data lake: Data from on-premises, user activity, and OLTP sources, as well as from stream processing, flows into the Data lake, which is represented by Cloud Storage. Batch: Data from the Data lake flows into this section, which includes Transfer Appliance, Transfer Service, and gsutil. Data mining and exploration: Data from the Data lake flows into this section, which includes Cloud Datalab and Cloud Dataprep. ML (training): Data from the Data lake flows into this section, which includes Cloud Datalab and Cloud ML Engine. ML (prediction): Data from the Data lake flows into this section, which includes Cloud Bigtable. Refined data: This section on the right shows the final outputs of the system, including Real-time store (Cloud Bigtable, Cloud Spanner), Data marts (Data warehouse: BigQuery; Hive, Spark, etc.: Cloud Dataproc, Cloud Storage), and Cloud Bigtable. <p>Arrows indicate the direction of data flow between these components, showing a complex network of data storage and processing capabilities.</p>

	<p>Cloud Storage as a data lake Cloud Architecture Center Google Cloud</p> <p>Source: https://cloud.google.com/architecture/build-a-data-lake-on-gcp</p>
<p>an I/O channel adapter for accepting an incoming I/O request from a host;</p>	<p>Cloud Storage has a first interface configured to receive input/output (I/O) traffic from a first host device via a dedicated I/O channel (traffic from a host device (on-premises sources), the I/O traffic comprising a read command</p>

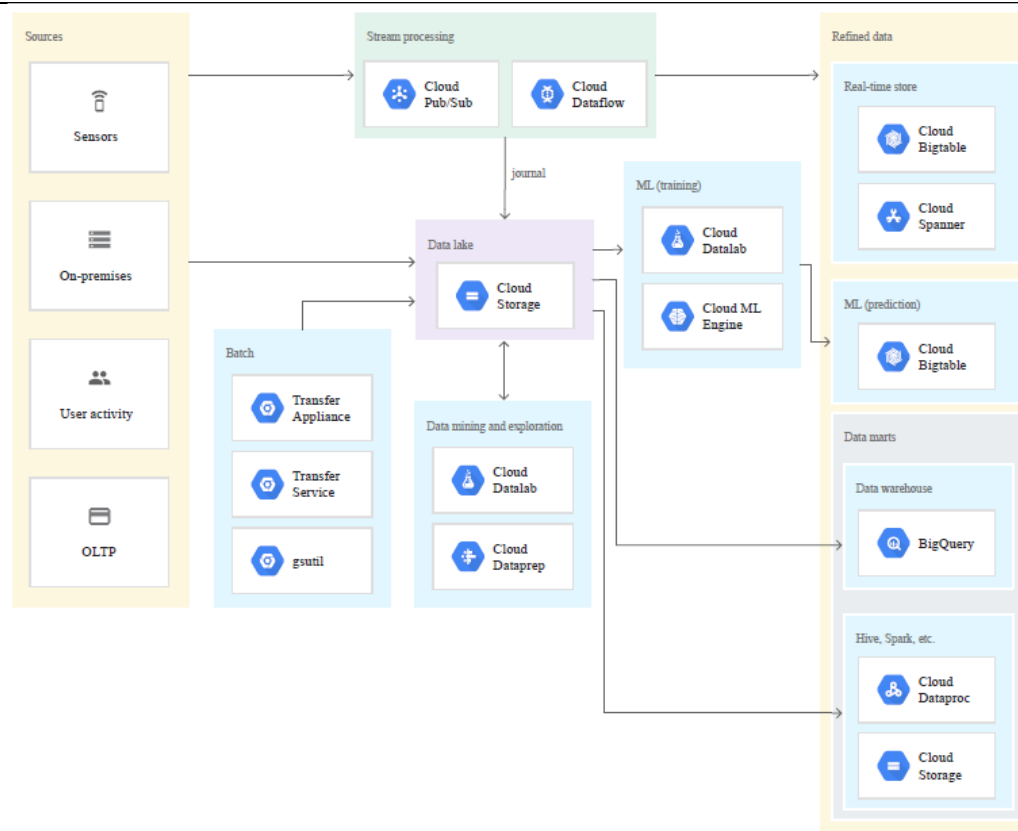


Cloud Storage as a data lake | Cloud Architecture Center | Google Cloud
 Source: <https://cloud.google.com/architecture/build-a-data-lake-on-gcp>

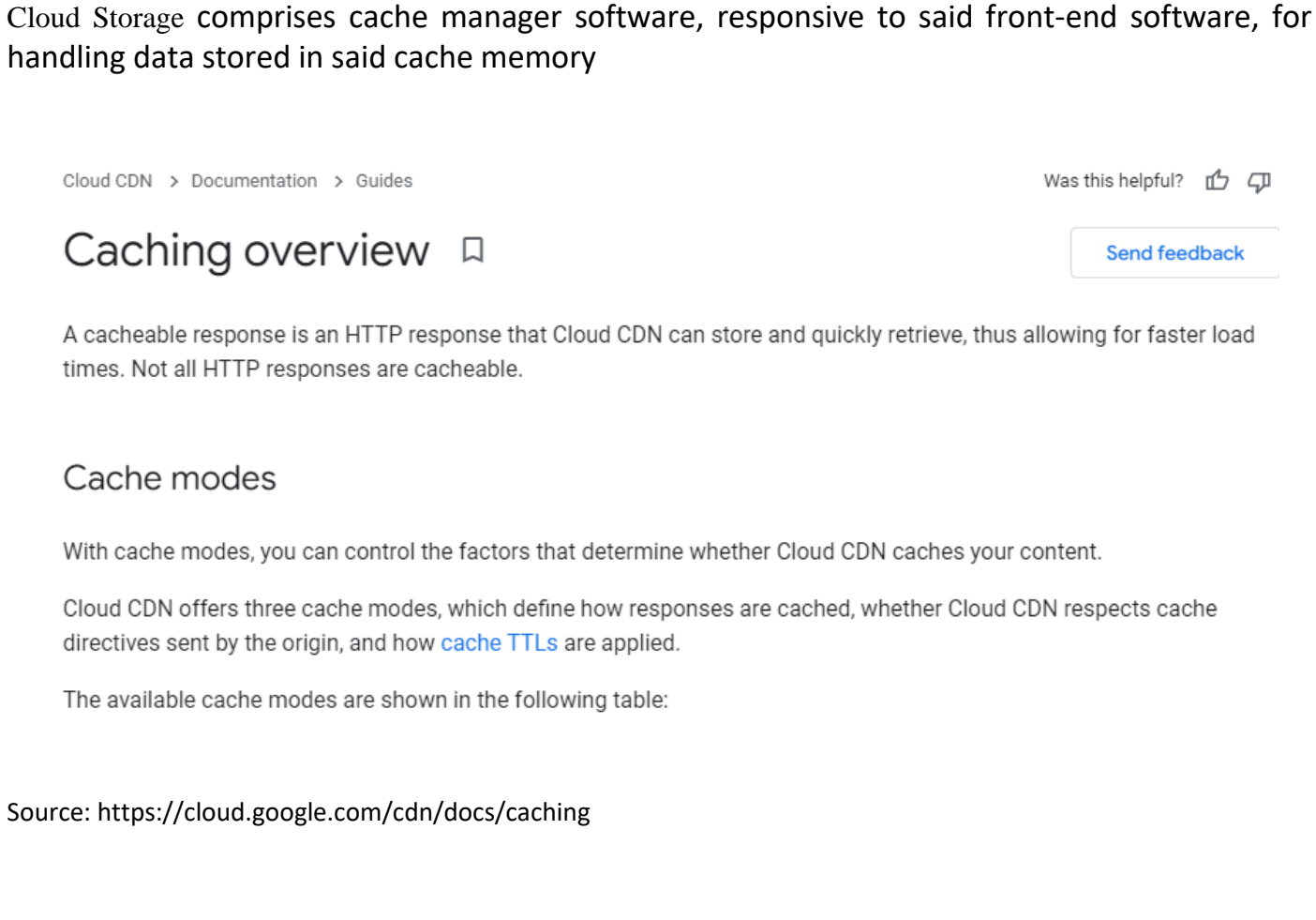
<p>configuration manager software for enabling said I/O channel adapter to decide whether (i) to route said request to cache, (ii) to route said request to disk, or (iii) to reject said request;</p>	<p>configuration manager software for enabling said I/O channel adapter to decide whether (i) to route said request to cache, (ii) to route said request to disk, accessed directly (Access operation)</p> <div data-bbox="569 310 1856 375"> <p>Overview of access control </p> <p>Send feedback</p> </div> <p>You control who has access to your Cloud Storage buckets and objects and what level of access they have.</p> <h3>Choose between uniform and fine-grained access</h3> <p>When you create a bucket, you should decide whether you want to apply permissions using <i>uniform</i> or <i>fine-grained</i> access.</p> <ul style="list-style-type: none"> • Uniform (recommended): Uniform bucket-level access allows you to use Identity and Access Management (IAM) alone to manage permissions. IAM applies permissions to all the objects contained inside the bucket or groups of objects with common name prefixes. IAM also allows you to use features that are not available when working with ACLs, such as IAM Conditions and Cloud Audit Logs. • Fine-grained: The fine-grained option enables you to use IAM and Access Control Lists (ACLs) together to manage permissions. ACLs are a legacy access control system for Cloud Storage designed for interoperability with Amazon S3. You can specify access and apply permissions at both the bucket level and per individual object. <p>Source: https://cloud.google.com/storage/docs/access-control</p>
<p>a network adapter for handling network control traffic;</p>	<p>Cloud Storage comprises network adapter for handling network control traffic</p>

	<div data-bbox="653 198 1854 1065"> <h2>Add a second NIC to your Migrate Connector </h2> <p>Send feedback</p> <p>Migrate to Virtual Machines enables your Migrate Connector to use two different network interface cards (NICs).</p> <p>If you want to use two NICs, first install your migrate connector, then verify your existing NIC ID before adding a second NIC to your Migrate Connector using vSphere and Migrate to Virtual Machines.</p> <div>  Note: Using a second NIC is optional. </div> <p>To add a second NIC to your Migrate Connector, follow these steps:</p> <ol style="list-style-type: none"> 1. Identify the first NIC ID on your Migrate Connector's VM by running the command: <div> <pre>\$ sudo ls /sys/class/net/ grep ens</pre>   </div> 2. Navigate to vSphere. Within vSphere, open the Network Adapter dialog: Click Select VM > Edit Settings > Add New Device > Network Adapter. 3. Identify the newly added NIC ID on your Migrate Connector's VM by running the following command: <div> <pre>\$ sudo ls /sys/class/net/ grep ens</pre>   </div> </div> <p>Source: https://cloud.google.com/migrate/virtual-machines/docs/5.0/how-to/second-nic</p>
a cache memory;	Cloud Storage comprises a cache memory

	<pre>def list_gcs_objects(google_access_key_id, google_access_key_secret, bucket_name): """Lists GCS objects using boto3 SDK""" # Create a new client and do the following: # 1. Change the endpoint URL to use the # Google Cloud Storage XML API endpoint. # 2. Use Cloud Storage HMAC Credentials. client = boto3.client("s3", region_name="auto", endpoint_url="https://storage.googleapis.com", aws_access_key_id=google_access_key_id, aws_secret_access_key=google_access_key_secret,) # Call GCS to list objects in bucket_name response = client.list_objects(Bucket=bucket_name) # Print object names print("Objects:") for blob in response["Contents"]: print(blob["Key"])</pre> <p>Source: https://cloud.google.com/storage/docs/migrating</p>
front-end software for handling I/O requests arriving at the I/O channel adapter or the network adapter;	Cloud Storage comprises front-end software for handling I/O requests arriving at the I/O channel adapter or the network adapter);



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 Source: <https://cloud.google.com/architecture/build-a-data-lake-on-gcp>

<p>cache manager software, responsive to said front-end software, for handling data stored in said cache memory; and</p>	<p>Cloud Storage comprises cache manager software, responsive to said front-end software, for handling data stored in said cache memory</p>  <p>The screenshot shows the 'Caching overview' page from Google Cloud CDN documentation. It includes a breadcrumb trail 'Cloud CDN > Documentation > Guides', a 'Was this helpful?' section with thumbs up/down icons and a 'Send feedback' button, and a definition of a cacheable response. It also has a section for 'Cache modes' explaining that they control whether Cloud CDN caches content and how cache directives and TTLs are applied. A source URL is provided at the bottom: https://cloud.google.com/cdn/docs/caching.</p>
<p>back-end software, responsive to said configuration manager software, for handling reads</p>	<p>back-end software, responsive to said configuration manager software, for handling reads and writes to disks corresponding to the I/O requests</p>

and writes to disks corresponding to the I/O requests but without communication over the I/O channel adapter, thereby separating disk operations from network and I/O traffic.

Compute Engine > Documentation > Guides



Was this helpful?  

Configure disks to meet performance requirements

[Send feedback](#)

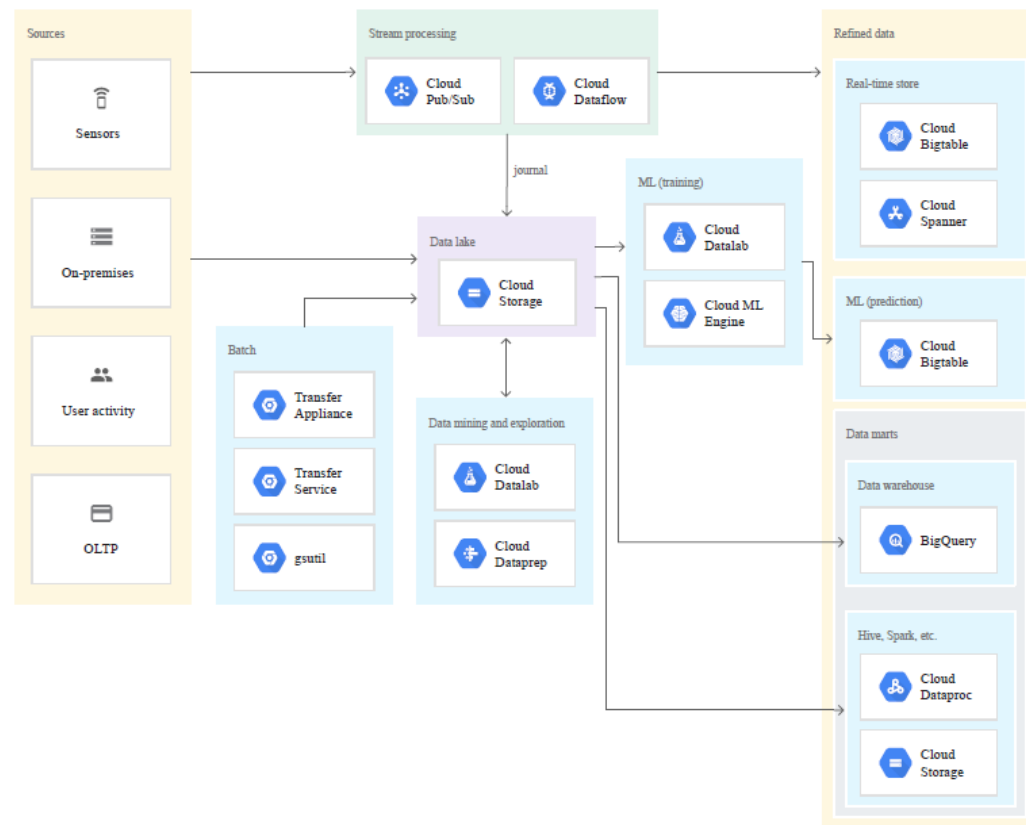
Overview

This page discusses the many factors that determine the performance of the block storage volumes that you attach to your virtual machine (VM) instances. Before you begin, consider the following:

- Persistent disks are networked storage and generally have higher latency compared to physical disks or [local SSDs](#). To reach the maximum performance limits of your persistent disks, you must issue enough I/O requests in parallel. To check if you're using a high enough queue depth to reach your required performance levels, see [I/O queue depth](#).
- **Make sure that your application is issuing enough I/Os to saturate your disk.**
- For workloads that primarily involve small (from 4 KB to 16 KB) random I/Os, the limiting performance factor is random input/output operations per second ([IOPS](#)) .
- For workloads that primarily involve sequential or large (256 KB to 1 MB) random I/Os, the limiting performance factor is [throughput](#) .

Source: <https://cloud.google.com/compute/docs/disks/performance>

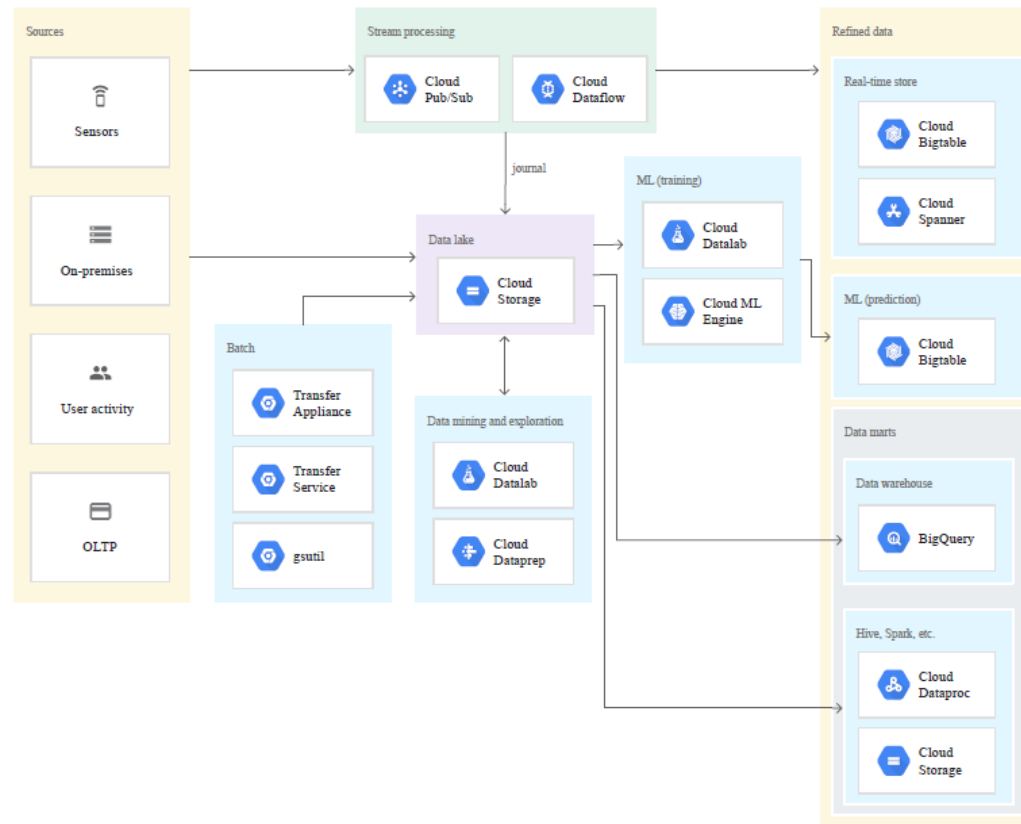
without communication over the I/O channel adapter, thereby separating disk operations from network and I/O traffic.



Cloud Storage as a data lake | Cloud Architecture Center | Google Cloud
 Source: <https://cloud.google.com/architecture/build-a-data-lake-on-gcp>




2. The system of claim 1 wherein the computers comprise off-the-shelf hardware and operating systems and further comprise: an adapter I/O software for accepting incoming I/O requests from a host; and a volume access table employed by the configuration manager to ensure consistency of data stored on the network.

The computer comprises off-the-shelf hardware

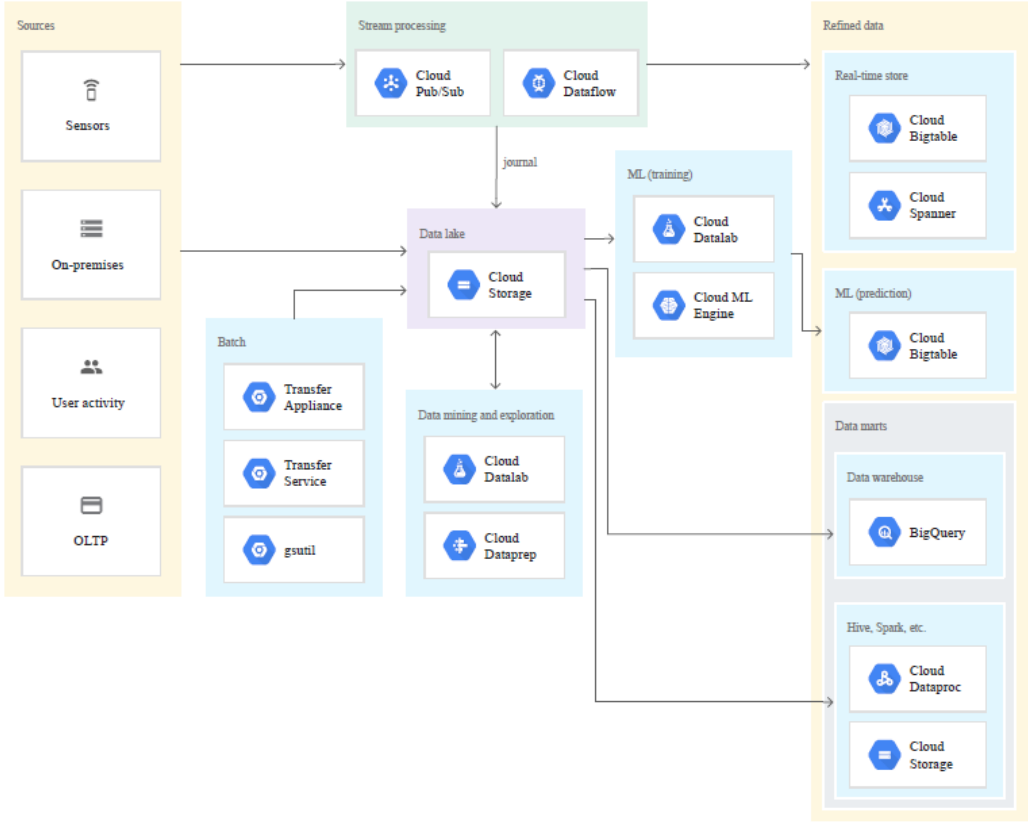


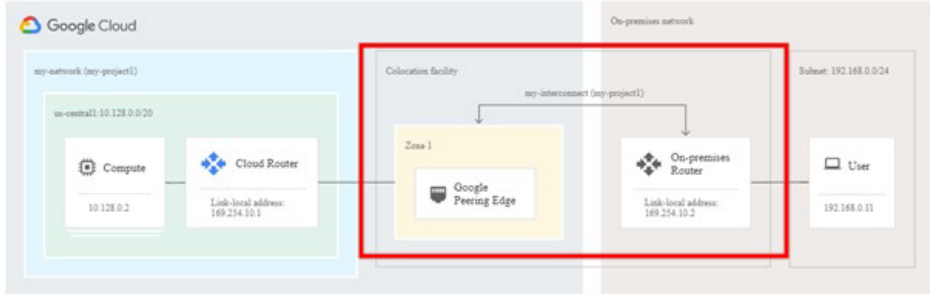
Cloud Storage as a data lake | Cloud Architecture Center | Google Cloud
Source: <https://cloud.google.com/architecture/build-a-data-lake-on-gcp>

The computers comprise off-the-shelf operating systems

	<div><div>Compute Engine > Documentation > Guides</div><div>Was this helpful?  </div><div><h2>View operating system details </h2><div>Send feedback</div></div><div><p>This document describes how to set up and use OS inventory management. For an overview of OS inventory management, see OS inventory management.</p><p>Use OS inventory management to collect and view operating system details for your virtual machine (VM) instances. These operating system details include information such as hostname, operating system, and kernel version. You can also get information about installed OS packages, available OS package updates, and OS vulnerabilities. For a list of common scenarios for using OS inventory management, review When to use OS inventory management.</p><p>Source: https://cloud.google.com/compute/docs/instances/view-os-details</p></div></div>
<p>6. A method of accessing a remote disk over a computer network without incurring network overhead, the method comprising the steps of:</p> <p>a. causing a local host to issue a</p>	<p>Google Storage Transfer Service provide a method of accessing a remote disk over a computer network without incurring network overhead</p>

<p>request over an I/O channel to a local computer;</p>	<h2 data-bbox="674 199 1293 245">What is Storage Transfer Service?</h2> <p data-bbox="674 293 1367 324">Storage Transfer Service is a product that enables you to:</p> <ul data-bbox="714 362 1820 597" style="list-style-type: none"><li data-bbox="714 362 1820 435">• Move or backup data to a Cloud Storage bucket either from other cloud storage providers or from your <u>on-premises</u> (/storage-transfer/docs/key-terms#on-prem) storage.<li data-bbox="714 464 1820 537">• Move data from one Cloud Storage bucket to another, so that it is available to different groups of users or applications.<li data-bbox="714 566 1820 597">• Periodically move data as part of a data processing pipeline or analytical workflow. <p data-bbox="531 654 1491 685">Overview Cloud Storage Transfer Service Documentation Google Cloud</p> <p data-bbox="531 691 1356 722">Source: https://cloud.google.com/storage-transfer/docs/overview</p> <p data-bbox="531 810 1896 846">Google Storage causes a local host to issue a request over an I/O channel to a local computer;</p>
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	 <p>Cloud Storage as a data lake Cloud Architecture Center Google Cloud Source: https://cloud.google.com/architecture/build-a-data-lake-on-gcp</p>
b. providing a configuration manager on the local computer, the	Google Storage provides a configuration manager on the local computer for Ethernet for network traffic(traffic from a host device (on-premises sources) via a dedicated I/O channel (Dedicated Interconnect Work) at a first interface).

<p>configuration manager routing the request to a remote computer via the computer network;</p>	<p>How does Dedicated Interconnect work?</p> <p>For Dedicated Interconnect, you provision a cross connect between the Google network and your own router in a common location. The following example shows a single Dedicated Interconnect connection between a GCP VPC network and on-premises network:</p>  <p>The diagram illustrates the Dedicated Interconnect architecture. On the left, the Google Cloud VPC network (my-network) contains a Compute instance (10.128.0.2) and a Cloud Router (Link-local address: 169.254.10.1). This router is connected to a Google Peering Edge in a colocation facility (Zone 1). The Peering Edge is connected to an On-premises Router (Link-local address: 169.254.10.2) in the on-premises network. The on-premises network also includes a User (192.168.0.11) and a Subnet (192.168.0.0/24). A red box highlights the colocation facility and the connection between the Google Peering Edge and the On-premises Router.</p> <p>Dedicated Interconnect overview Source: https://cloud.google.com/storage-transfer/docs/on-prem-overview</p>
<p>c. causing the remote computer to check the request against a volume access table;</p>	<p>a volume access table is checked</p>

Setting up private service access

1. Create an allocated IP address range within your VPC network for the Cloud Volumes Service mount points.

You can't modify the IP address range after you establish it and allocate it to a volume, so we recommend allocating a range that is large enough to accommodate future usage. However, if the IP address range allocation is too small, you can add additional CIDR ranges. For more information, see [Adding CIDR ranges](#).

- The CVS-Performance service type needs a minimum CIDR block of /24 (16 /28 CIDR blocks, which each have 16 IP addresses). Some addresses in the block are used for CVS internal needs, leaving 11 addresses for your volumes from a /28 block. Larger blocks support additional region and project pairs. For example, a /32 block supports up to 32 combinations of region and consumer service project pairs.
- The CVS service type (Standard-SW) needs a minimum CIDR block of /25 (128 addresses). This supports up to the maximum 100 volumes for each project (for each zone or region, depending on the service level). A larger block can support more region and project pairs. Cross-region access isn't supported.
- [Shared VPC](#) is supported for the CVS and CVS-Performance service types. For shared VPC networks, peering is done from the host project only. Each service project in an additional region uses an additional CIDR block of /28 from the VPC range.

Source: <https://cloud.google.com/architecture/partners/netapp-cloud-volumes/setting-up-private-services-access>

d. causing the remote computer to perform an I/O operation on a disk located on the remote computer and to return data to the local computer;

e. causing the local computer to provide the returned data to the local host via the I/O channel; and

f. causing the local computer to check the data against the volume access table to ensure consistency of the data on the local and the remote computers.

causing the remote computer to perform an I/O operation on a disk located on the remote computer (remote access) .causing the local computer to check the data against the volume access table to ensure consistency of the data on the local and the remote computers.

3. Enable custom route propagation:

CVS service type example:

```
gcloud \
  --project=my-cvs-prj compute networks peerings update netapp-sds-nw-customer-peer \
  --network=production-vpc1 \
  --import-custom-routes \
  --export-custom-routes
```

CVS-Performance service type example:

```
gcloud \
  --project=my-cvs-prj compute networks peerings update netapp-cv-nw-customer-peer \
  --network=production-vpc1 \
  --import-custom-routes \
  --export-custom-routes
```

4. Check that the connection is established:

```
gcloud \
  --project=my-cvs-prj services vpc-peerings list \
  --network=production-vpc1
```

Source: <https://cloud.google.com/architecture/partners/netapp-cloud-volumes/setting-up-private-services-access>